

ert and Buckman) are paratypes as well as isotypes and should be so labeled. If the type specimen is lost or unavailable an isotype is in general much more important than a paratype for the interpretation of a name.

LECTOTYPE. A holotype selected from among cotypes subsequent to the original description. It should be selected by a reviser on the basis of actual study of the original description and all the material involved in it, not mechanically on the basis of priority of position or because the name of one of the collectors was adopted for the specific name.

TOPOTYPE. A specimen from the type locality.

DIVISION OF PLANT EXPLORATION AND INTRODUCTION,  
BUREAU OF PLANT INDUSTRY,  
Washington, D. C.

## VIRGINIAN BOTANIZING UNDER RESTRICTIONS

M. L. FERNALD

(Continued from page 480)

SOME VARIETIES AND SPECIES OF HELENIUM (PLATES 796–799).—As a genus *Helenium*, in its present sense, was first called *Helenia* L. Hort. Cliff. 418 (1737). It consisted of a single species, *Helenia foliis decurrentibus*, based in part on the plant of Clifford's garden (our PLATE 797, FIG. 1), in part upon many references to previously described plants of European gardens called *Heleniastrum*, *Chrysanthemum* or *Aster*, the latter not actually before Linnaeus. When the genus was taken up at the nomenclaturally critical date, 1753, and assigned a binomial it was as *Helenium autumnale* L. Sp. Pl. ii. 886 (1753). The citations then given by Linnaeus indicate the two plants somewhat generally found at that time in European gardens, and, although in N. Am. Fl. xxxvi<sup>2</sup>. 127 (1915) Rydberg says that the type came from Canada, Linnaeus himself in 1753 was not so explicit, he then saying "*Habitat in America septentrionali*". In Hortus Cliffortianus he had said "*in Florida & Canada*".

The plant of Clifford's garden (our PLATE 797, FIG. 1) had narrowly lanceolate and long-acuminate, nearly entire leaves, few long-peduncled heads, the mature disk 1.8+ cm. broad, the narrow ligules strongly narrowed at base, 2 cm. long and only 2.5–3.3 mm. broad at the sharply trifid apex. Except that its



leaves are rather more spreading and its branching looser, it closely matches the plant of tidal shores of the St. Lawrence (FIG. 2), there found from near Montreal to below Quebec, and extending westward through much of the St. Lawrence basin and far to the southwest. Rydberg's inference was correct, apparently, that this plant originated in Canada. The second plant cultivated in Europe was the extreme which Linnaeus preserved in his own herbarium (presumably from the Upsala garden) and which, according to the late Dr. B. Daydon Jackson, was before him in preparing *Species Plantarum*, ed. 1. This (our PLATE 796, FIG. 1) is the coarser plant of our Northeast, with more elliptic and broader, toothed leaves, and large heads, with the mature disk of the leading head nearly 2.2 cm. broad, the flat and cuneate ligules 2.2–2.3 cm. long and 8.3–11.7 mm. broad at the bluntly lobed summit. Just such a plant (FIG. 2), with ligules up to 2.5 cm. long, occurs from western New England to Minnesota, south to New Jersey, upland to western North Carolina, Kentucky and Missouri. *Helenium autumnale* of 1753 consisted of both extremes and there is logic in interpreting either of them as the type. In a nomenclature beginning with 1753 (not 1737 and earlier), however, the plant in the Linnean Herbarium, the specimen Linnaeus definitely had before him in preparing *Species Plantarum*, is here selected. It is the extreme of the species which most students of the past have treated as *H. autumnale*, as will later be noted.

Both of them being in European gardens, whence they were described by Ventenat in 1720, Miller, with no reference to Linnaeus, took his cues directly from Ventenat, not from the Linnean Herbarium. Miller called *Helenium autumnale* the narrow-leaved extreme, the "*Bastard Sun-flower with a longer and narrower leaf*," the *Heleniastrum folio longiore & angustiore* of Ventenat; and the plant with broader leaves and larger heads, the *Heleniastrum folio brevior & latior* of Ventenat, Miller called *Helenium latifolium* Mill. Gard. Dict. ed. 8 (1768), the "*Bastard Sun-flower with a broader and shorter leaf*". Among botanists of the period, however, Miller was essentially alone in his interpretation. Lamarck, Smith, Schkuhr and other botanists, far more precise than the very impressionistic Miller, took the broad-leaved and large-headed plant (our PLATE 796) of the Linnean Herbarium as



true *H. autumnale*. Thus Lamarck described as a new species, *H. canaliculatum* Lam. in Journ. d'Hist. Nat. ii. 213, t. 35 (1793) the narrow-leaved plant of European gardens which Ventenat had called *Heleniastrum folio longiore & angustiore* and which Miller took up as *H. autumnale*. Lamarck's description and life-sized illustration (our PLATE 797, FIG. 3) indicated unbranched plants with solitary large heads with ligules 1.6 cm. long and only 3–5 mm. broad at the sharply toothed summit: "Semi-flosculi 15–18, foeminei, distincti, patentes: ligulis concavo-canaliculatis, apice tridentatis". Lamarck went on "L'*Helenie canaliculée* diffère évidemment de l'*Helenie* d'automne (dict. vol. 3, pl. 81) . . . par son aspect, son port, et principalement par le caractère de ses demi-fleurons, qui ne sont point élargis, planes, et réfléchis comme dans ces [referring to both *H. autumnale* and *H. quadridentatum*] espèces"; and in summary he contrasted his *H. canaliculatum* "*semi-flosculis canaliculatis*" and *H. autumnale* "*semi-flosculis planis reflexis*". Somewhat later Lamarck, Ill. iv. t. 688, fig. 1 (1797), illustrated his conception of *H. autumnale*, the plant of the Linnean Herbarium.

*Helenium canaliculatum* Lam. (portion of his illustration, shown in our PLATE 797, FIG. 3) was unquestionably the same as the plant (our PLATE 797, FIG. 1) of the Clifford garden. Except for the more spreading leaves, a natural response to the ameliorations of cultivation, *H. canaliculatum* is the extreme (FIG. 2) of *H. autumnale* which characterizes the tidal shores of the St. Lawrence from above Montreal to below Quebec, thence westward to Minnesota and Iowa. That region was the source of many plants early carried to Europe and a very inexact and obviously conventionalized plate of it with similarly elongate leaves, too many heads for the wild plant, and tremendously multiplied but characteristic rays was described and illustrated as *Aster luteus alatus* by Cornut, *Canadensium Plantarum*, 62, 63 (1635). The life-sized head and reduced leaves from Cornut's plate are here reproduced as PLATE 797, FIGS. 4 and 5. It will be noted that its disk is 2 cm. broad, its ligules about 1.5 cm. long and 4–5 mm. broad at the sharply toothed summit. It is obviously of the same variety as the plant of the Clifford garden and as that of the Paris garden described and illustrated by Lamarck as his *H. canaliculatum*.



When Sir James Edward Smith purchased and eventually established in London the herbarium of Linnaeus he intimately knew the collection and in his many articles in Rees' Cyclopedia he clearly designated what he understood, from studying the collection and literature, as the types of many Linnean species. Thus, in Rees, Cycl. xvii. (1819), he took as *H. autumnale* the plant of the Linnean Herbarium with "*Leaves elliptic-lanceolate, . . . more or less deeply serrated. Flowers large*", etc., while for the plant of European gardens with "*Leaves linear-lanceolate, entire*", etc., the *H. autumnale* sensu Miller, he proposed the new name *H. longifolium* Sm. In treating as typical *Helenium autumnale* the plant which Lamarck had already (1793) selected and which he soon (1797) illustrated I am not only following the very careful Lamarck and Smith but am trying to keep the concept which has prevailed among most botanists until Rydberg. Witness, besides the illustration by Lamarck and the treatment by Smith, the following illustrations of *H. autumnale*: Schkuhr, Bot. Handb. ed. 2, t. 250a (1808); Barton, Fl. N. Am. i. t. 26 (1821); Raf. Med. Fl. i. t. 47 (1828); Hook. in Bot. Mag. lvii. t. 2999 (1830); Meehan, Fl. and Fern U. S. ii. t. 29 (1879); and so on to Britton & Brown, Ill. Fl. iii. 450 (1898) and House, Wild Fl. N. Y. ii. t. 261 (1918). By so doing less violence is done well established and fully justified usage than by taking up for the plant of Linnaeus's own herbarium, labeled by him *H. autumnale*, the name *H. latifolium* Mill., as is done by Rydberg in the N. Am. Fl. xxxiv<sup>2</sup>. 127 (1915). In there taking up as *H. autumnale* the *H. longifolium* Sm. Rydberg showed that he did not understand the latter. If he had understood it he would not have referred *H. canaliculatum* Lam. (clearly *H. autumnale* sensu Miller and *H. longifolium* Sm.) without question to the synonymy of *H. latifolium*; and if he had understood *H. autumnale* of Herb. L. and of Lamarck, Schkuhr, Smith, Barton *et al.* (*H. latifolium* Mill.) he would not have contented himself with "ligules 10-15 mm. long". In the type they are 2.3 cm. long.

Besides typical *Helenium autumnale* (*H. latifolium* Mill.) and the rather local var. *canaliculatum* (Lam.) Torr. & Gray, Fl. N. Am. ii. 284 (1842), a combination not cited in the North American Flora, we have a wide-ranging southern extreme of the species (PLATE 798), the plant with small and narrow rays which was



described as a species, *H. parviflorum* Nutt. Although *H. parviflorum* in most extreme variations is very different from true *H. autumnale*, their ranges overlap and it is most difficult to find any stable morphological character to keep them apart. The chief claim of *H. parviflorum* to recognition is its extension far south of the other varieties, a plant with the flowering and fruiting disk only 0.8–1.5 cm. broad (as opposed to 1.6–2.3 cm. in true *H. autumnale*), the ligules 3–12 mm. long and only 3–7 mm. broad (as opposed to 1.6–2.5 cm. long and 7–12 mm. broad in true *H. autumnale*). For six days (a full week) I have boiled out disk-florets and ligules, seeking in the *H. autumnale* complex some stable characters of disk-corollas, pappus and achenes, and, although there is extreme diversity in the number, shape and length of the pales of the pappus, sometimes short, sometimes much longer and more slender, sometimes in several lengths, and while the disk-corollas may have very short or almost obsolete tubes, or the tubes may be prolonged and the throat more campanulate, I have been quite incapable of making these divergencies fall into clear geographic patterns or associate themselves with other characters. After concentrated study for a week I get back to the decision of Torrey & Gray who wrote: "Some of our varieties are possibly species; but they accord in every thing but the pappus, which also presents every intermediate gradation. The var.  $\beta$ . [the western var. *grandiflorum* (Nutt.) Torr. & Gray] is the only state we have seen from Oregon, Saskatchewan, &c.: but a state with a nearly similar pappus is common in New York; while other specimens, otherwise undistinguishable, present a reduced and merely acute pappus".—Torr. & Gray, l. c. (1842). Torrey & Gray had a score or so of specimens; the ten score of specimens from which I have boiled (to clarify and straighten) the florets have failed to bring any more clarification than they could get from their hand-full of material.

Excluding the plants from west of the "Manual range", the great bulk of inclusive *Helenium autumnale* seems to me to fall into three recognizable geographic varieties:

HELENIUM AUTUMNALE L. Sp. Pl. ii. 886 (1753) in part (as to plant of Herb. L. bearing the identification of Linnaeus); Lam. in Journ. d'Hist. Nat. ii. 215 (1793) and Ill. iv. t. 688, fig. 1 (1797);



Schkuhr, Bot. Handb. ed. 2, t. 250a (1808); Smith in Rees, Cycl. xvii (1819); Barton, Fl. N. Am. i. t. 26 (1821); Raf. Med. Fl. i. t. 47 (1828); Hook. in Bot. Mag. lvii. t. 2999 (1830); Torr. & Gray, Fl. N. Am. ii. 384 (1842); Meehan, Fl. and Ferns U. S. ii. t. 29 (1879); Britton & Brown, Ill. Fl. iii. 450 (1898); House, Wild Fl. N. Y. ii. t. 261 (1918). *H. latifolium* Mill. Gard. Dict. ed. 8, *Helenium* no. 2 (1768); Rydb. in N. Am. Fl. xxxiv<sup>2</sup>. 127 (1915) as to plant, not as to most citations. *Helenia autumnalis* Hill, Hort. Kew. 6 (1769). *Helenium pumilum* Willd. Enum. Suppl. 60 (1813). *H. altissimum* Link ex Rydberg l. c. 126 (1915).—Stem 0.5–1.5 m. high, wing-angled, simple or branching, corymbose-branched at summit; leaves elliptic, oblong or lanceolate, acuminate, membranaceous, the larger coarsely dentate ones 0.5–1.6 dm. long and 2–5.5 cm. broad; heads few-many, peduncled, in terminal corymb; fully developed disk 1.6–2.3 cm. broad; ligules flat, cuneate, deep yellow, soon reflexed, 1.6–2.5 cm. long, 7–12 mm. broad at the bluntly toothed or lobed summit; pappus much shorter than to two thirds as long as disk-corolla.—Rich thickets, meadows and shores, western New England to Minnesota, south to New Jersey, western North Carolina, Kentucky and Missouri, northward passing into var. *canaliculatum*, southward into var. *parviflorum*. A few fairly typical specimens are the following. MASSACHUSETTS: Stockbridge, September 5, 1912, *R. Hoffmann*; Sheffield, September 30, 1919, *Churchill*. CONNECTICUT: Hartford, September 15, 1882, *Chas. Wright*; East Haven, October 7, 1902, *Woodward*. NEW YORK: Canton, *Phelps*, no. 1001; South Bay, Madison County, *House*, no. 10,815; Sylvan Beach, Oneida Co., *House*, nos. 2843 and 8705; Dryden, *MacDaniels & Eames*, no. 1313. NEW JERSEY: Fieldsboro, *Long*, no. 18,221; southwest of Harrisonville, *Long*, no. 45,269. PENNSYLVANIA: Washington Crossing, Bucks County, September 25, 1923, *Meredith*; Wissahickon Ravine, Philadelphia County, September 24, 1924, *Henry A. Lang*; Sayre, *Barbour*, no. 815. WEST VIRGINIA: Greenbrier River, Pocahontas County, *Greenman*, no. 534; Hendricks, Tucker County, *Greenman*, no. 536. ONTARIO: Tobermory, *Krotkov*, no. 7908 (mixed with var. *canaliculatum*). OHIO: Garrettsville, Portage County, *R. J. Webb*, no. 400. ILLINOIS: Bloomington, August, 1886, *B. L. Robinson*. OUR PLATE 796.

Var. CANALICULATUM (Lam.) Torr. & Gray, Fl. N. Am. ii. 284 (1842). *H. autumnale* L. Sp. Pl. ii. 886 (1753) in part, as to some citations, not as to plant of Linnean Herb. designated by Linnaeus; Mill. Gard. Dict. ed. 8 (1768); Rydb. in N. Am. Fl. xxiv<sup>2</sup>. 127 (1915). *H. pubescens* Ait. Hort. Kew. iii. 227 (1789). *H. canaliculatum* Lam. in Journ. d'Hist. Nat. ii. 213, t. 35 (1793). *Halenie decurrens* Moench, Meth. 589 (1794), both as to description and citation only of the Morison figure which is of most



characteristic *H. canaliculatum*, and obviously copied from Cornut. *Helenium longifolium* Sm. in Rees, Cycl. xvii, *Helenium* no. 2 (1819). *H. autumnale pubescens* (Ait.) Britton in Mem. Torr. Bot. Cl. v. 339 (1894).—Stem relatively slender, 3.7–9 dm. high with 1–many heads; leaves linear to lanceolate, entire or shallowly denticulate, firm, subrigid, the larger ones 3–12 cm. long and 3–18 mm. broad; mature disk 1–2 cm. broad, ligules strongly narrowed and often convolute at base, 1–2 cm. long, and 2–7 mm. broad at the shallowly and sharply to bluntly toothed summit.—Estuary of the St. Lawrence River, Quebec, west to Minnesota and Nebraska, south to Massachusetts (adventive), New York and northern Ohio, Indiana, Illinois, Missouri, Texas and Arizona.<sup>1</sup> Some characteristic specimens are as follows: QUEBEC: Cap Rouge, *Victorin*, no. 28,177; St. Vallier, *Svenson & Fassett*, no. 3022; Berthier, Montmagny County, *Fernald & Pease*, no. 25,324; Longueuil, *Victorin*, no. 18,376; Boucherville, *Victorin*, no. 27,574. MASSACHUSETTS: Clam Shell Bluff, Concord, September 9, 1934, *R. J. Eaton* (adventive, leaves more toothed than in most material). NEW YORK: Canton, *Phelps*, no. 1002; Springport, *Eames & Wiegand*, no. 11,007. ONTARIO: Tobermory, *Krotkov*, no. 7908 (mixed with typical *H. autumnale*); Birch Island, Lake Huron, *Macoun*, no. 26,508 (distributed as *H. huronense* Britton, an herbarium-name unfortunately published in synonymy, therefore with no status, by Rydberg in N. Am. Fl. xxxiv<sup>2</sup>. 127 (1915)). OHIO: Windham Township, Portage County, *R. J. Webb*, no. 5554. WISCONSIN: St. Croix Falls, August 20, 1900, *C. F. Baker*; La Crosse, *Pammel*. ILLINOIS: Aurora, September, 1882, *T. E. Boyce*; Urbana, *Pease*, no. 12,504. MINNESOTA: Lake City, August 15, 1883, *W. H. Manning*. IOWA: Iowa Falls, Hardin County, August, 1928, *M. E. Peck*; Redfield, Dallas County, August 27, 1867, *J. A. Allen*; Fayette, August, 1894, *Fink*. NEBRASKA: Beaver Creek, Holt Co., *Fred Clements*, no. 2858; South Fork of Dismal River, *Rydberg*, no. 1690. MISSOURI: Dodson, *Bush*, no. 4148, distrib. as *H. montanum*; Columbia, Boone Co., *Lisle Jeffrey*, no. 261. KANSAS: Chautauqua Co., *Hitchcock*, no. 737. TEXAS: banks of streamlets about Friedrichsburg, *Lindheimer*, no. 477. ARIZONA: cañon at Fort

<sup>1</sup> Passing westward, from Saskatchewan and North Dakota to eastern Washington, south to New Mexico, into the shorter- and broader-leaved

Var. *montanum* (Nutt.), stat. nov. *H. montanum* Nutt. in Trans. Am. Phil. Soc. n. s. vii. 384 (1841).

For note on *H. autumnale pubescens* (Ait.) Britton see p. 492. It is probable that Aiton had the two plants which were in general cultivation in Europe, not the western var. *montanum* to which Rydberg doubtfully refers var. *pubescens*.

Farther west, in British Columbia, Washington and Oregon, becoming the large-flowered

Var. *grandiflorum* (Nutt.) Torr. & Gray, Fl. N. Am. ii. 384 (1842); Gray, Syn. Fl. N. Am. i<sup>2</sup>. 349 (1884); independently published by Howell, Fl. Nw. Am. 359 (1900). *H. grandiflorum* Nutt. l. c. (1841).



Huachuca, *Lemmon*, no. 2776. PLATE 797.—Many specimens transitional to the preceding and the following, and on the Plains of the West to var. *montanum*.

Aiton, Hort. Kew. iii. 227 (1789), had a *H. pubescens*, described simply “*H. foliis pubescentibus*”. Torrey & Gray and, later, Gray treated it as synonymous with the inclusive *H. autumnale*, of which the typical variety is subglabrous, in both places wrongly citing the page as “287”. In Mem. Torr. Bot. Cl. v. 339 (1894) we get the unexplained combination *H. autumnale pubescens* Britton, based upon *H. pubescens* Ait. of page “287”. Had the author of the new trinomial looked up Aiton, instead of copying the error of Torrey & Gray and of Gray, he would have noted that *H. pubescens* was on p. 227. I have not seen Aiton’s type; neither had Britton. From the date (1789) it is probably var. *canaliculatum*.

\*Var. **parviflorum** (Nutt.) stat. nov. *H. parviflorum* Nutt. in Trans. Am. Phil. Soc. ser. 2, vii. 384 (1841).—Leaves membranaceous or submembranaceous, elliptic, oblong, lanceolate or oblanceolate, coarsely toothed to subentire, the larger ones 0.5–1.5 dm. long and 0.7–3.5 cm. broad; mature disk 0.8–1.5 cm. broad; ligules 3–12 mm. long and 3–7 mm. broad, often canaliculate below.—Bottomlands, swamps and other low grounds, Florida to Arkansas, north to Connecticut, New York, Pennsylvania, Kentucky, Illinois and southeastern Iowa, thoroughly typical and isolated southward, passing insensibly into the two preceding northward. The following, from a very large series before me, are characteristic. CONNECTICUT: Sprague, August 9, 1900, *Woodward*; Selden Cove, Lyme, August 29, 1901, *Bissell*; Stratford, August 16, 1895, *Eames*. NEW YORK: old specimens without designated locality, *Torr. & Gray, Fl.* NEW JERSEY: east of Silverton, Ocean County, *Fogg*, no. 4901 (narrowest-leaved extreme); Mays Landing, August 28, 1910, *W. Stone*; Cold Spring, *Fogg*, no. 235; Treasure Island, Hunterdon County, *Long*, no. 38,291. PENNSYLVANIA: Delaware County, 1861, *Canby*, called by Gray *H. parviflorum*, with the later comment “Passes for but ??”, the material (relatively thin-leaved) marked by Rydberg as *H. longifolium* Sm., i. e. *H. autumnale* var. *canaliculatum*; Dillerville Swamp, Lancaster County, September 18, 1889, *Heller*. DELAWARE: Bayville, Sussex County, *Fogg*, no. 11,271; north of Leipsic, Kent County, *Fogg*, no. 6230. WEST VIRGINIA: Roland Park, Cabell County, *Gilbert*, no. 546. VIRGINIA: Hunting Creek, southwest of Alexandria, *G. H. Shull*, no. 188; Bedford County, September, 1873, *A. H. Curtiss*; Jamestown Island, James City County, *Fernald &*





Photo. B. G. Schubert.

HELENIUM GODFREYI: FIG. 1, TYPE,  $\times \frac{1}{2}$ ; FIG. 2, achene,  $\times 10$   
 H. FLORIDANUM: FIG. 3, portion of TYPE,  $\times 1$ ; FIG. 4, achene,  $\times 10$   
 H. NUDIFLORUM: FIG. 5, achene,  $\times 10$



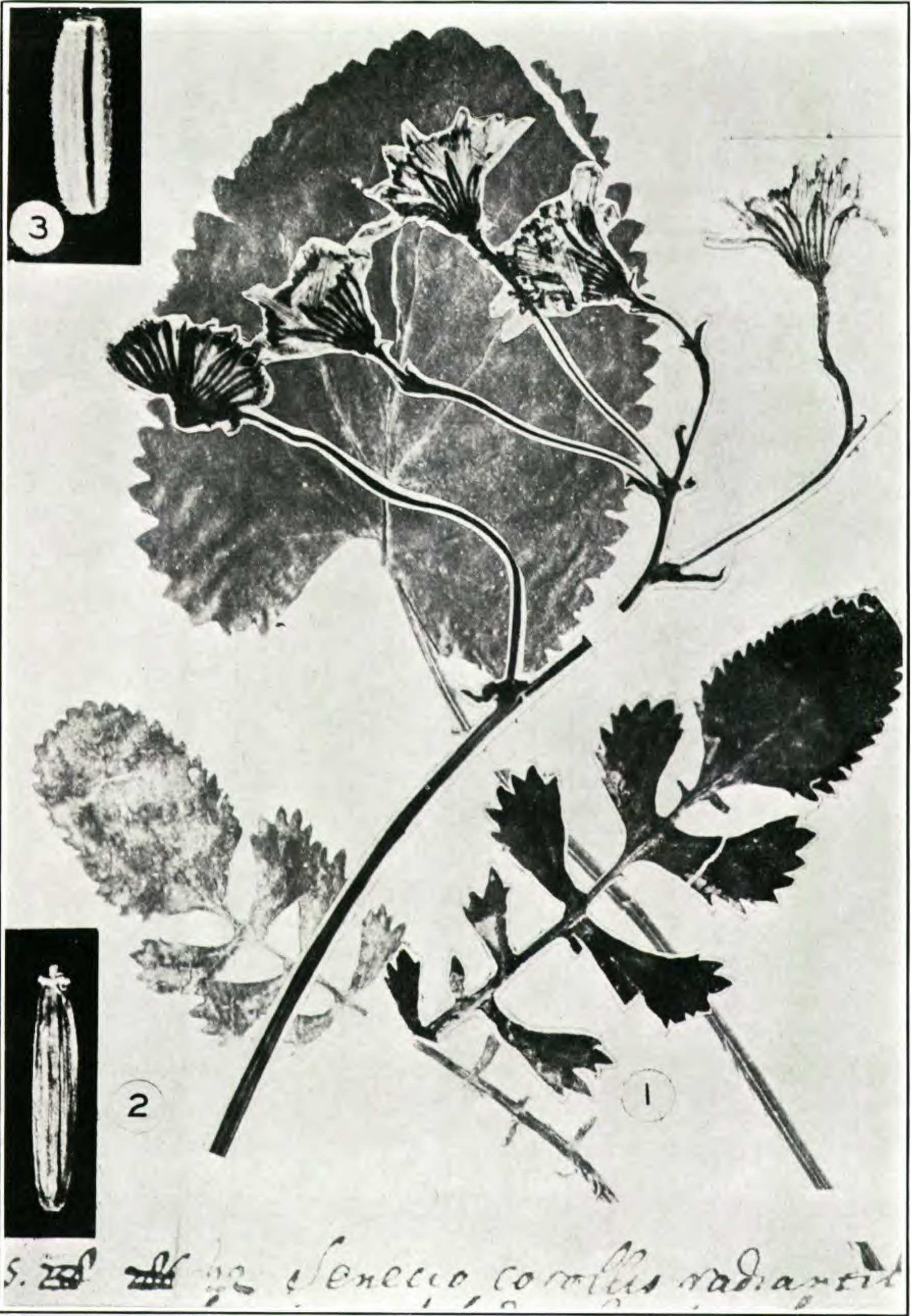


Photo. B. G. Schubert.

SENECIO AUREUS: FIG. 1, portions of TYPE,  $\times 1$ , from photograph sent from *Linnean Society of London*; FIG. 2, achene,  $\times 10$ , from Virginia  
S. TOMENTOSUS: achene,  $\times 10$ , from Virginia



*Long*, no. 11,204; Kittewan Creek, Weyanoke, Charles City County, *Fernald & Long*, no. 11,483; near Creeds, Princess Anne County, *Fernald, Long & Fogg*, no. 5139; Northwest, Norfolk County, *Fernald & Long*, no. 14,068; northwest of Suffolk, *Fernald & Long*, no. 13,833; Factory Hill, Nansemond County, *Fernald & Long*, no. 4914; south of South Quay, Nansemond County, *Fernald & Long*, no. 11,482; southeast of Burgess, Dinwiddie County, *Fernald & Long*, no. 7713; southeast of Stony Creek, Sussex County, *Fernald & Long*, no. 13,832; Meherrin River, south of Edgerton, Brunswick County, *Fernald & Lewis*, nos. 14,515 (leaves short, broad and sparsely toothed) and 14,516 (leaves narrower and sharply and copiously toothed). NORTH CAROLINA: near Hillsboro, Columbus County, *Godfrey*, no. 6278; north of Burgaw, Pender County, *Godfrey*, no. 6537; near Sunford, Lee County, *Godfrey*, no. 6911; Winston-Salem, *Godfrey*, no. 6094; Sylva, Jackson County, September 18, 1897, *E. E. Magee*. SOUTH CAROLINA: near Georgetown, *Godfrey & Tryon*, no. 8240. GEORGIA: Macon, September 3, 1883, *J. D. Smith*; Warsaw, Long County, *Eyles*, no. 7655. FLORIDA: St. Mark's, Wakulla County, *Nash*, no. 2534; Apalachicola, *Biltmore Herb.*, no. 515a. KENTUCKY: near Wasioto, Bell County, *Kearney*, no. 506. TENNESSEE: Knoxville, *W. A. Anderson*, no. 638; Townsend, September 26, 1936, *Luther Burns*. ALABAMA: without stated locality, *Nuttall* (possible type or isotype of *H. parviflorum*—bearing *Nuttall's* asterisk and entirely agreeing with his description, although as noted by Gray, *Syn. Fl.* i<sup>2</sup>. 349, *Nuttall* cited it as from Georgia); on Bogue Chitto, Perry County, September 1, 1885, *J. D. Smith*; near Marion, Perry County, September 2, 1885, *J. D. Smith*; Auburn, Lee County, *Earle & Earle*, no. 89. MISSISSIPPI: Taylorville, *Tracy*, no. 8529; Jackson, September 6, 1885, *J. D. Smith*. ILLINOIS: Champaign, *Pease*, no. 12,389; Peoria, September, 1904, *F. E. MacDonald*. IOWA: Keosauqua, *Pammel & Reis*, no. 465. MISSOURI: Bakersfield, Ozark County, *E. J. Palmer*, no. 32,829; Greenwood, *Bush*, no. 4134; Noel, *Bush*, nos. 5265 and 5270. PLATE 798.

In the plastic group with disk globose or globose-ovoid and usually brown or purplish, the receptacle ovoid and the ray-flowers sterile or neutral, *Rydberg* treats both *Helenium nudiflorum* Nutt. and *H. polyphyllum* Small as good species. Only by recognizing the smallest specimens with narrowest cauline wings as the former, the largest ones with broadest wings as the latter, ignoring the large series of transitional specimens can one do so. The intermediate pile is altogether too large; but in our Southeast there are two extremes, native of low woods and swamps and evidently local endemics, which seem to be really



well defined species. In typical campestrian and aggressively weedy *H. nudiflorum* (including *H. polyphyllum*) the pales of the pappus are narrowly lanceolate to lance-ovate and 0.5–1.6 mm. long, the pales attenuate to narrow tips or scabrous awns, the firm and usually scabridulous cauline leaves linear to narrowly lanceolate or oblanceolate. In southeastern South Carolina, however, there is a plant of this series, occurring in low woods or in wooded bottomlands, with membranaceous and quite smooth cauline leaves lance- to elliptic-oblong, the pappus of blunt and awnless round or oval small pales. This I am calling

**H. Godfreyi**, sp. nov. (TAB. 799, FIG. 1 et 2), *H. nudifloro* habitu simillima; foliis caulinis membranaceis laevibus lanceolato-vel elliptico-oblongis; achaeniis glabris verrucosis, pappi paleis albidis suborbicularibus vel ovalibus muticis 0.4–1.4 mm. longis.—SOUTH CAROLINA: creek-bottom through rich lowland-woods, 4 miles west of Georgetown, June 27, 1939, *Godfrey & Tryon*, no. 124; cleared strip along logging railroad through floodplain-forest, Santee River, 3 miles northeast of Pineville, Berkeley County, July 14, 1939, *Godfrey & Tryon*, no. 586 (TYPE in Herb. Gray.).

This localized species is named for ROBERT KENNETH GODFREY whose extensive field-work is greatly clarifying our knowledge of Carolina plants.

Another relative of *Helenium nudiflorum* is concentrated in the northern half of Florida. In this plant the relatively small heads are either rayless or with well developed ligules, but the ovate pappus-pales (1–1.6 mm. long) are rounded at tip and terminated by a very long, filiform and smoothish awn. This plant seems worthy of recognition as

**H. floridanum**, sp. nov. (TAB. 799, FIG. 3 et 4), capitulis valde corymbosis radiatis vel eradiatis; pappi paleis 1–1.6 mm. longis ovatis apice rotundatis abrupte aristatis, aristis filiformibus laevibus.—FLORIDA: moist ground near Jacksonville, May 28, 1891, *Curtiss*, no. 4972; low grounds, Duval County, July, *Curtiss*, no. 1520; hummock-land, Eustis, Lake County, April 15–30, 1894, *Nash*, no. 550; around ponds in pine woods, Sumter County, June 5, *Curtiss*, no. 11; low open woods near Fitzgerald, Hernando County, June 14, 1900, *Curtiss*, no. 6663 (TYPE in Herb. Gray., distributed by Curtiss with an unpublished varietal name and with the note: "Uniformly without rays along the Withlacoochee River"); waste ground in Tampa, June 1, 1886, *Curtiss*, no. 12.



PLATE 796 is of *HELENIUM AUTUMNALE* L.,  $\times 1$ : FIGS. 1 and 2, portions of TYPE in Linnean Herb., original photograph through kindness of Mr. S. Savage; FIG. 2, summit of plant from Garrettsville, Portage County, Ohio, R. J. Webb, no. 400.

PLATE 797, *H. AUTUMNALE*, var. *CANALICULATUM* (Lam.) Torr. & Gray,  $\times 1$ , except FIG. 5: FIG. 1, portion of *Helenia foliis decurrentibus*, etc. of Hortus Cliffortianus, courtesy of Dr. John Ramsbottom; FIG. 2, summit of plant from River St. Lawrence, Berthier, Montmagny County, Quebec, Fernald & Pease, no. 25,324; FIG. 3, portion of original plate of *H. canaliculatum* Lam.; FIGS. 4 and 5, portions of illustration of *Aster luteus alatus* of Cornut, Canad. Pl. (1635).

PLATE 798, *H. AUTUMNALE*, var. *PARVIFLORUM* (Nutt.) Fern.,  $\times 1$ : FIG. 1, portion of TYPE or ISOTYPE of *H. parviflorum* Nutt.; FIG. 2, summit of plant from south of South Quay, Nansemond County, Virginia, Fernald & Long, no. 11,482.

PLATE 799, FIGS. 1 and 2, *H. GODFREYI*, n. sp.: FIG. 1, TYPE,  $\times \frac{1}{2}$ ; FIG. 2, achene,  $\times 10$ . FIGS. 3 and 4, *H. FLORIDANUM*, n. sp.: FIG. 3, fragment of TYPE,  $\times 1$ ; FIG. 4, achene,  $\times 10$ . FIG. 5, achene,  $\times 10$ , of *H. NUDIFLORUM* Nutt., from Emporia, Virginia, Fernald & Long, no. 10,451.

**SENECIO AUREUS AND ITS GEOGRAPHIC VARIETIES AND ALLIES IN EASTERN NORTH AMERICA (PLATES 800–806)**—To one who from boyhood has known as *Senecio aureus* the common glabrous or promptly glabrate plant of peaty meadows, swales and swampy thickets of New England, New York and Pennsylvania, with suborbicular to round-ovate obtusely crenate radical leaves which are tufted from very slender and cord-like elongate rhizomes and basal offshoots, it is very disconcerting on every trip to tidewater Virginia to see as a dominating plant of calcareous woods and fertile bottomland, never in meadows and boggy places, a coarser plant with stout almost finger-like purple basal offshoots, very large heads and, when young, a copious long tomentum at the bases of the petioles, on the unexpanded leaf-surfaces and over the unexpanded corymb, and to be obliged to call it also *S. aureus*. So different is this southern plant of rich woods from the common plant of swamp and swale northward that it, again, comes as a surprise to find that it is true *S. aureus* L. Sp. Pl. ii. 870 (1753). Linnaeus based the species primarily upon the Clayton collection, nos. 249 and 286, from Virginia, described by Gronovius, with a second reference to the *Jacobaea virginiana* of Morison and of Ray. The Clayton plant, which is the TYPE (our PLATE 800, FIG. 1) is very characteristic material of the woodland species of eastern Virginia, and phrases in the account by Gronovius but not quoted by Linnaeus are peculiarly significant to one who knows the southern plant, “leviter superne lanatis, radice parva atro-rubente”, for the woodland plant of tidewater Virginia is



very striking on account of the purple or dark red stiff rhizomes and basal offshoots and the lanate tomentum of the unexpanded corymb. "Madidis & umbrosis gaudet" of the Clayton account is also wholly satisfactory. So is the contradiction between the brief italicised diagnosis of Gronovius with "*foliis crenatis*" and the fuller account below "*foliis infimis rotundis ad marginem serratis*", for the type shows the margin serrate-dentate or with somewhat emarginate-truncate teeth as in some of the southern specimens, while the phrase "*foliis crenatis*", taken over by Linnaeus, fits other specimens.

Since the common plant of the northeastern states differs in several characters from typical southern *Senecio aureus*, standing midway between it and var. *gracilis* (Pursh) Wood, and since the more northern membranous-leaved plant (of Newfoundland, Anticosti, Gaspé, northern New England, etc.) which has erroneously passed as the Cordilleran *S. pseud aureus* Rydb., needs clarification, I am here summarizing my interpretation of the varieties of *S. aureus*:

- a. Radical leaves dentate with rounded or blunt teeth....b.
- b. Undivided basal leaves suborbicular to round-ovate, broadly rounded at summit, with a well defined cordate base.  
 Basal offshoots at flowering time 4-10 mm. thick, deep red or purple; margins of basal sheaths of many petioles, surfaces of unexpanded leaves and unexpanded corymbs with long dense flocculent tomentum; involucre 8-11 mm. high; disk-corollas 6-10 mm. long; achenes 3.5-4 mm. long.....*S. aureus* (typical).  
 Basal offshoots at flowering time 1-5 mm. thick, green to purple; margins of basal sheaths of petioles, surfaces of unexpanded leaves and unexpanded corymbs glabrous or sparsely short-tomentose and glabrescent; involucre 5-8 (-9) mm. high; disk-corollas 5-8 mm. long; achenes 2-3.5 mm. long.  
 Stems 3-9 dm. high, often 2 or more; rhizomes and basal offshoots mostly 2-10 cm. long; radical leaves becoming firm and subcoriaceous, the larger ones 6-15 cm. long and 3-12 cm. broad, often purplish beneath, the longer petioles 0.5-3 dm. long; involucre 5-9 mm. high.....Var. *intercurus*.  
 Stems slender, mostly solitary, 2-6 dm. high; basal offshoots rarely 6 cm. long; radical leaves membranaceous, 1-3.5 cm. long, 1-2.8 cm. broad, green both sides, the longer petioles 2-10 cm. long; involucre 5-7 mm. high.....Var. *gracilis*.
- b. Undivided basal leaves oblong-oval, rounded to base or some of them barely subcordate, the larger blades 2-6.5 cm. long and 1.5-4.3 cm. broad, submembranaceous.....Var. *semicordatus*.



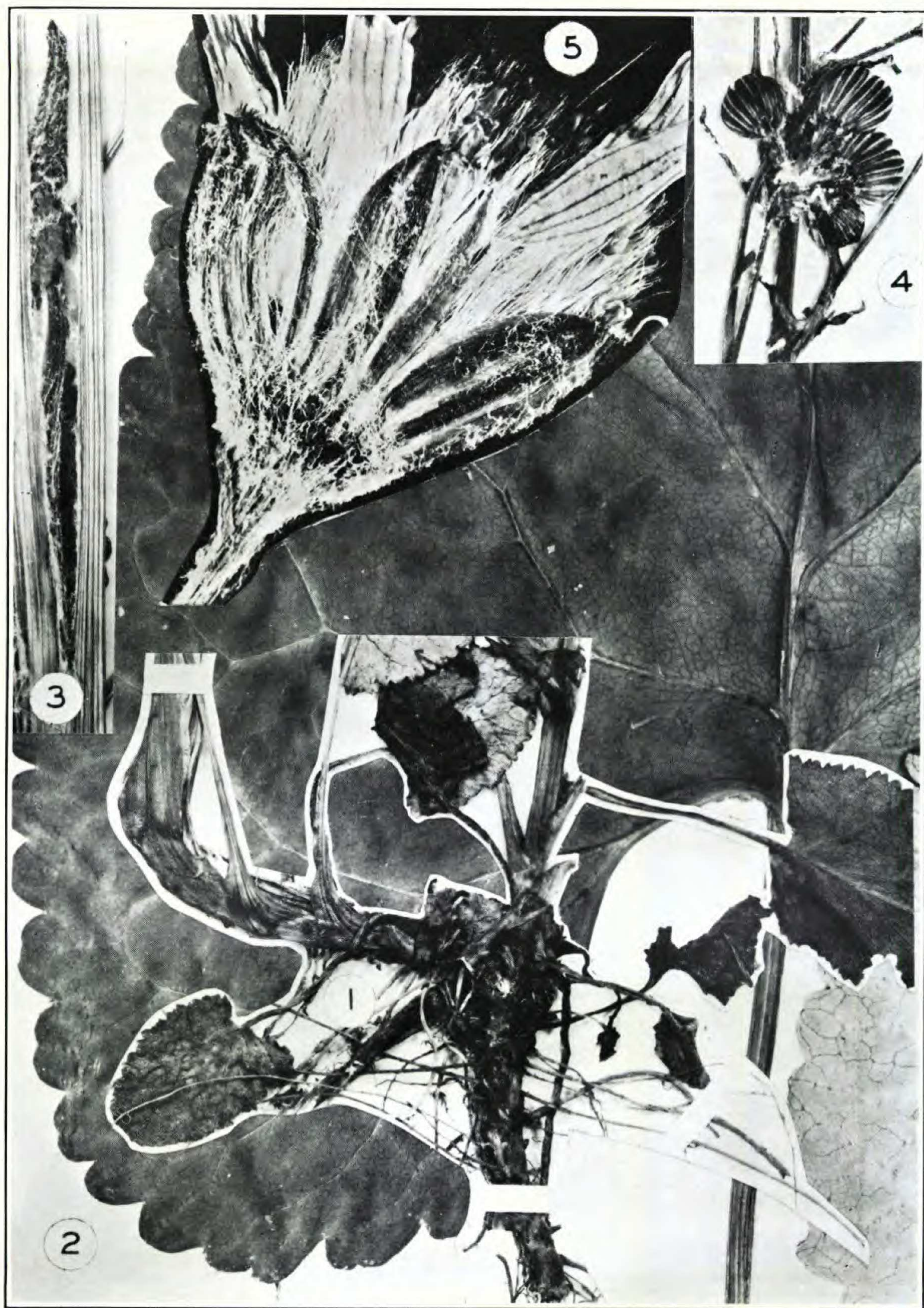


Photo. B. G. Schubert.

SENECIO AUREUS, details from modern specimens from Virginia: FIG. 1, rhizome and basal offshoot,  $\times 1$ ; FIG. 2, portion of full-grown basal leaf,  $\times 1$ ; FIG. 3, expanding young basal leaves, showing archnoid pubescence,  $\times 2$ ; FIG. 4, unexpanded heads, showing archnoid pubescence,  $\times 2$ ; FIG. 5, involucre,  $\times 5$



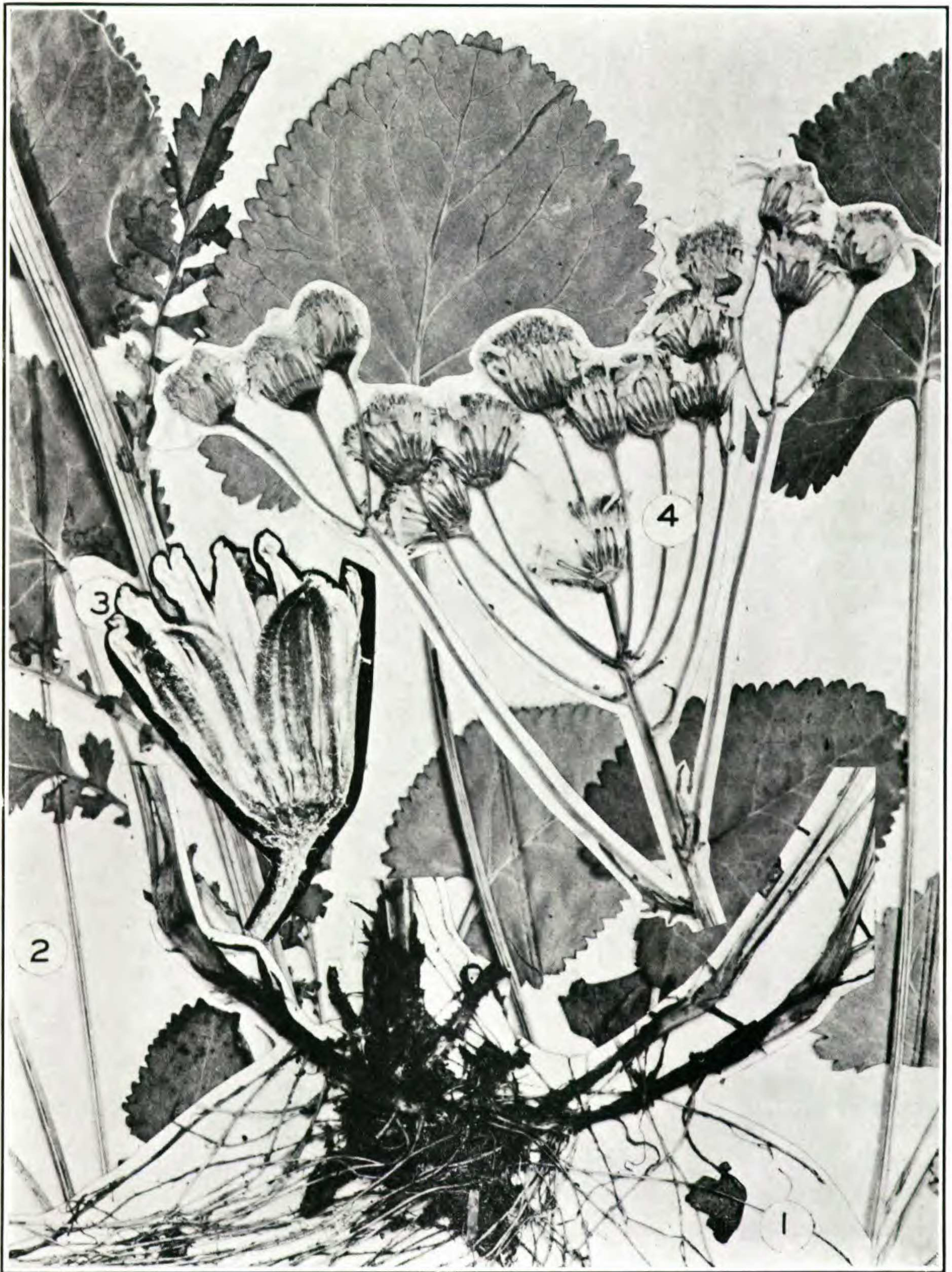


Photo. B. G. Schubert.

SENECIO AUREUS, var. INTERCURSUS, all figs. from TYPE: FIG. 1, rhizome and basal offshoots,  $\times 1$ ; FIG. 2, basal and lower cauline leaves,  $\times 1$ , FIG. 3, involucre,  $\times 5$ ; FIG. 4, inflorescence,  $\times 1$



- a. Radical leaves sharply serrate or dentate at least at base to acutely or subacutely lacerate, ovate or oval to rotund, deeply cordate, acute to rounded at tip, membranaceous.

Var. *aquilonius*.

*S. AUREUS* L. Sp. Pl. ii. 870 (1753). Var. *Ashei* Greenm. in Ann. Mo. Bot. Gard. xvi. 406, pl. 35 (1929).—Rather stout; stiff basal offshoots purple, 3–15 cm. long; flowering stems 3–12 dm. high; radical leaves rounded- to oblong-ovate, becoming coriaceous, in maturity up to 2.2 dm. long and 1.8 dm. broad.—Rich calcareous woods and wooded bottomlands or in upland meadows, Florida to Arkansas, north to Virginia, Kentucky and Missouri. The following are characteristic. VIRGINIA: locality not stated, “*Madidis & umbrosis gaudet*”, Clayton (TYPE, photo in Gray Herb., our PLATE 800, FIG. 1); rocky bank of brook north of Hopewell Gap, western slope of Bull Run Mountain, Allard, no. 4540; margin of woods, east of Wattsville, Accomac County, R. R. Tatnall, no. 4441; damp woods, Eastville, April 21, 1935, M. Ellyson & E. Puette; rich woods, Great Neck, Princess Anne County, Fernald & Griscom, no. 4517; low woods, Cypress Swamp, north of Dendron, Fernald, Long & Abbe, no. 14,243; rich alluvial woods, east of Cabin Point, Fernald & Long, no. 7985; bottoms of rich calcareous wooded ravines west of Claremont, Fernald & Long, no. 12,893; sandy alluvial woods, bottomland of Powell Creek, Garyville, Fernald & Long, no. 7984. NORTH CAROLINA: wet, shady ground, Biltmore, Biltm. Herb. no. 889<sup>a</sup>. FLORIDA: banks of Little River, Chapman. TENNESSEE: Maryville, Blount County, May 8, 1937, Godfrey; low wooded slope along Bean’s Creek, Franklin County, Svenson, no. 10,018. MISSOURI: along James R., south of Springfield, Greene Co., September, 1934, Richard Smith & Lisle Jeffrey; along Shoal Creek, southwest of Joplin, E. J. Palmer, no. 29,936. ARKANSAS: wet places, “N. W. Arkansas”, April, 1888, Harvey, no. 45. See p. 361. PLATES 800, FIG. 1, and 801.

*Senecio aureus* in southeastern Virginia definitely crosses with *S. tomentosus* Michaux. In April, 1942, Long, Abbe and I found (see p. 361) an extensive colony growing at the upper border of bottomland-woods of Cypress Swamp near Dendron, with typical *S. aureus* in the woods, typical *S. tomentosus* in the open. The intermediate plants, some with narrow and merely round- to tapering-based radical leaves suggesting those of *S. tomentosus*, others with them broader and subcordate, all more or less tomentulose and with tomentose to glabrescent petioles, has the involucre tomentose. It is clearly *S. aureus* × *tomentosus*. Foliage-material, misidentified as *S. Crawfordii* Britton, from a wooded ravine west of Claremont, Fernald & Long, no.



12,892, is very similar but smoother, and its stout and elongate horizontal rhizome keeps it out of *S. Crawfordii* (see p. 506). It was a single plant growing with typical *S. aureus*, with *S. tomentosus* abundant only a few rods away. That much is clear.

In Ann. Mo. Bot. Gard. xiv. 406, pl. 35 (1929) Greenman described as *S. aureus*, var. *Ashei* a plant of western Virginia and adjacent northeastern Tennessee, there growing in moist meadows. Evidently having in mind as true *S. aureus*<sup>1</sup> the glabrescent plant of wide northern and continental range, the author of var. *Ashei* emphasized for the latter the distinctive characters of typical southern *S. aureus*: "foliis inferioribus longe petiolatis . . . crenato-serratis juventate utrinque albo-floccoso-tomentosis supra denique plus minusve glabratis". Evidently puzzled by the presence of tomentum on the young and unexpanded basal leaves in his var. *Ashei*, just such pubescence as occurs on the youngest basal leaves of the plant of Clayton's region (see PLATE 801, FIG. 3), and frequently on the involucre as well (see FIG. 5), Greenman surmised that this plant of the mountain-region of western Virginia and eastern Tennessee might be a hybrid of his *S. aureus* (presumably our var. *intercursus*) and the coastal plain *S. tomentosus*: "The origin of the plant is not known . . . It may be a hybrid. There are some indications that it may be a hybrid between *Senecio aureus* L. and *Senecio tomentosus* Michx. The former of these two species occurs in the valley of the South Fork of the Holston River, and the latter species is relatively common in eastern Virginia. While the habit of the new plant is like *Senecio aureus*, yet the prevailing outline of the leaves of the offshoots and those of the lower parts of the upright stem, as well as their texture and tomentose character, suggests *Senecio tomentosus*."—Greenm. l. c. 405. The type of *S. aureus* var. *Ashei* was poorly collected, showing no rhizomes, but in outline of basal leaves and cauline leaves (so far as the mashed and crumpled leaves show) the foliage looks quite like that of the TYPE of *S. aureus* and of the characteristic specimens above cited and illustrated (PLATES

<sup>1</sup> Among the specimens taken by Dr. Greenman to Berlin for his preliminary studies one in the Gray Herbarium of a small plant midway between vars. *gracilis* and *intercursus*, from Rhode Island, bears the pencilled memorandum: "This specimen of Thurber's corresponds very well with specimens of *S. aureus* L. in herb. Willdenow at Berlin". The Thurber specimens and specimen like it at Berlin (if not now destroyed) are very different from the Clayton type.



800, FIG. 1 and 801). Although on the coastal plain true and characteristic *S. aureus* rarely crosses with *S. tomentosus*, producing a pretty mixed progeny, some plants with horizontal rhizomes and basal offshoots of *S. aureus*, others cespitose as in *S. tomentosus*, there is no reason to imagine that the cespitose, heavily and permanently tomentose *S. tomentosus*, with its narrow and noncordate radical leaves, its undivided or but shallowly toothed cauline leaves, its columnar and heavily hirtellous drab achenes (PLATE 800, FIG. 3) with prominent rounded ridges—there is no reason to imagine that such a plant, restricted to sterile soils of the Coastal Plain and adjacent provinces, had anything to do with the origin of the continental and upland species of rich or calcareous areas, with horizontal elongate rhizomes and basal offshoots, oval to orbicular and deeply cordate glabrous or glabrescent radical leaves, glabrous and deeply pinnatisect cauline ones, and glabrous, slender brown to reddish achenes (FIG. 2) without very prominent ridges. The cited stations of *S. aureus*, var. *Ashei* are more than 200 miles west of the nearest stations known for *S. tomentosus*!

*Senecio aureus*, var. *aurantiacus* Farwell in Am. Midl. Nat. xii. 74 (1930) is described as having red stems and “traces of floccose tomentum present throughout the plant at the flowering time”. Its distinctive character, “Ligules . . . 3–4 lines long . . . , orange-red, reflexed” is one unknown to me. The description otherwise does not make clear what var. *aurantiacus* may be, in a region where many variations occur.

Var. **intercursus**, var. nov. (TAB. 802), planta glabra vel glabrata; rhizomatibus sobolibusque horizontalis 2–5 mm. crassis sobolibus plerumque 2–10 cm. longis; foliis radicalibus rotundo-vel late oblongo-ovatis cordatis, laminis glabris deinde subcoriaceis crenatis vel obtuse dentatis ad 6–15 cm. longis ad 3–13 cm. latis utrinque viridibus vel subtus purpurascentibus, petiolis longioribus 0.5–3 dm. longis; involucris glabris vel glabratis 5–9 mm. altis; disci corollis 5–8 mm. longis; achaeniis 2–3.5 mm. longis.—Meadows, boggy swales, swamps and low woods, southern Quebec to Michigan, south to Nova Scotia, New England, Pennsylvania, upland to Alabama, Kentucky and Missouri. TYPE: Tewksbury, Massachusetts, June 7, 1902, *E. F. Williams* in Gray Herb.

Var. *intercursus*, standing between the coarse, southern typical *Senecio aureus* and the smallest variety of the species, var.



*gracilis* (Pursh) Wood, is the plant most generally passing as typical *S. aureus*.

\*Var. INTERCURSUS I have seen from Virginia only from ROANOKE COUNTY: moist woods along Back Creek, south-south-east of Starkey Post Office, C. E. Wood, Jr., no. 3988. It is presumably of broader upland range.

Var. GRACILIS (Pursh) Wood, Class-Bk, 211 (1845), independently published as a new comb. by Britton in Britt. & Brown, Ill. Fl. iii. 481 (1898). *S. gracilis* Pursh, Fl. Am. Sept. ii. 529 (1814).—Meadows, swamps and bogs, Massachusetts to North Dakota (acc. to Greenman), south to North Carolina and Arkansas.

Var. SEMICORDATUS (Mackenzie & Bush) Greenm. in Ann. Mo. Bot. Gard. iii. 129 (1916). *S. semicordatus* Mackenz. & Bush in Mo. Bot. Gard. Ann. Rep. xvi. 107 (1905). *S. aureus* × *Balsamitae* Greenm. in RHODORA, x. 69 (1908).—Calcareous thickets, shores, meadows, etc., locally abundant, western Newfoundland; Gaspé Peninsula, Quebec, to southern Ontario, south to northern New Brunswick, Eastern Townships, Quebec, northern Ohio, Illinois and Missouri.

*S. AUREUS* L., var. **aquilonius**, var. nov. (TAB. 803), planta valde rhizomatosa, rhizomatibus gracilibus valde horizontaliterque elongatis (ad 3 dm. longis); foliis basilaribus membranaceis ovatis vel ovalibus vel rotundis serratis vel acute vel subacute incisis ad basin valde cordatis; foliis caulinis membranaceis basi pinnatifidis.—Newfoundland and Côte Nord and Anticosti Island, Quebec, to Algoma District, Ontario, south to Cape Breton, Prince Edward Island, northern New Brunswick, northern New England, northern New York, northwestern Pennsylvania, northern Ohio, northern Indiana and Wisconsin. Many specimens previously misidentified with the western *S. pseud-aureus* Rydb. The following, selected from a very large series, are characteristic. NEWFOUNDLAND: brookside, Grand Falls, July 3, 1911, *Fernald & Wiegand*, no. 6398; park-like openings in damp mossy woods on the Silurian hills back of Birchy Cove (Curling), July 5, 1910, *Fernald & Wiegand*, no. 4174; spruce woods and thickets, slope of Lookout Mountain, Bonne Bay, *Fernald, Long & Fogg*, no. 2145; brooksides and damp bushy ravines on the limestone tableland, alt. 200–300 m., Table Mountain, Port à Port Bay, July 16 and 17, *Fernald & St. John*, no. 10,872; damp openings in woods near Overfall Camp, Great Codroy River, July 7, 1939, *Pease & Edgerton*. QUEBEC: dans les bois claire près de la rivière, Rivière de Rénard, Anticosti, 5 août 1927, *Victorin & Rolland*, no. 27,645; dans les bois de Conifères, R. Vaureal, Anticosti, 12 août 1927, *Victorin & Rolland*, nos. 27,640 and 27,641; mossy Arbor Vitae woods east





Photo. B. G. Schubert.

SENECIO AUREUS, var. AQUILONIUS, all figs.  $\times 1$ , from TYPE: FIG. 1, elongate rhizome and basal offshoot; FIG. 2, basal leaves; FIG. 3, cauline leaves; FIG. 4, inflorescence





Photo. B. G. Schubert.

SENECIO PAUPERCULUS: FIG. 1, TYPE,  $\times \frac{3}{4}$ , from photograph by M. L. Fernald; FIGS. 2-4, unusually tall plants,  $\times 1$ , from Newfoundland



of Grande Coupe, Percé, August 6, 1907, *Fernald & Collins*, no. 1208; springy meadows in woods at 600 m. altitude, North Fork of Madeleine River, Gaspé County, July 31, 1923, *Fernald, Dodge & Smith*, no. 26,096; calcareous alpine meadows, alt. 1000–1125 m., Table-top Mountain, August 7, 1906, *Fernald & Collins*, no. 260; coniferous forest, "Low's Trail" from the Forks of the R. Ste. Anne des Monts to Table-topped Mountain, July 31 and August 14, 1906, *Fernald & Collins*, nos. 765, 766 (TYPE in Herb. Gray), 767; wet alluvial shores, between Baldé and the Baie des Chaleurs, Bonaventure River, August 5–8, 1904, *Collins, Fernald & Pease*; gravel-beaches and bars between the Forks and Brulé Brook, Little Cascapedia River, July 29 and 30, 1904, *Collins, Fernald & Pease* (*Pease*, no. 5022); slaty bank, Restigouche River, July 24–25, 1929, *Rousseau & Bonin*, no. 32,211. NOVA SCOTIA: Barrasois R., Cape Breton, *Nichols*, no. 852. PRINCE EDWARD ISLAND: swampy *Larix* and *Thuja* woods, Tignish, *Fernald, Long & St. John*, no. 8245. MAINE: wet thicket, Limestone, June 22, 1898, *Fernald*; arbor-vitae swamp, Presque Isle, July 12, 1902, *Williams, Collins & Fernald*; cedar-swamps and clearings, Blaine, June 23, 1898, *Fernald* no. 2404; damp thicket, Patten, August 23, 1897, *Fernald*; wet open woods, Roque Bluffs, July 23, 1914, *C. H. Knowlton*; meadow near Half-moon Stream, Unity, June 16, 1935, *G. B. Rossbach*, no. 926; wet ground, open woods, Clinton, July 8, 1909, *R. C. Bean*; South Poland, 1895, *Kate Furbish*. NEW HAMPSHIRE: damp shady roadside between First and Second Lakes, Pittsburg, July 6, 1907, *A. H. Moore*, no. 3523, *Pease*, no. 10,316; wet place in woods, Hill, August 29, 1933, *Chas. Bullard*; rich woods, Durham, June 21, 1939, *Hodgdon*, no. 4034. NEW YORK: Oneida, May 15, 1918, *House*. PENNSYLVANIA: Corry, May 7, 1896, *J. R. Churchill*. ONTARIO: black-ash swamp, Sault Ste. Marie, July 18, 1935, *Taylor et al.*, no. 1687. OHIO: Garrettsville, Portage County, *Webb*, no. 202. MICHIGAN: tamarack swamp, south of Ann Arbor, May 8, 1898, *S. H. Burnham*; Port Huron, May 18, 1896, *C. K. Dodge*. INDIANA: along a brook, Otis, May 20, 1911, *Sherff*. WISCONSIN: Brown County, June 11, 1900, *Schuette*.

*Senecio aureus*, var. *aquilonius* is the northeastern plant which has recently been passing in my own work and that of others as *S. pseud aureus* Rydb. It certainly strongly suggests the plant of the Cordilleran region in the texture and tothing of its basal leaves and the tendency to laceration and enlargement of the lower cauline blades. *S. pseud aureus*, however, has a stout and relatively short rhizome which usually forks into a tuft of crowded ascending crowns; its basal leaves tend to be oblong-ovate as in



*S. aureus*, var. *semicordatus* (Mackenz. & Bush) Greenm. and only slightly, if at all, more cordate, though sometimes broader, on thickish petioles 1–10 (rarely –23) cm. long; its pale-flowered heads are on pedicels 1–5 (rarely –9) cm. long. *S. aureus*, var. *aquilonius* stands off from it through its slender and horizontally creeping rhizome (up to 3 dm. long), with scattered ascending branches and tufts of leaves or flowering stems; it thus belongs with *S. aureus* var. *intercursus* and passes into it. Its basal leaves are ovate to oval or even orbicular, deeply cordate, on filiform petioles mostly 0.5–2.5 dm. long; and its deep yellow-flowered heads are on filiform pedicels mostly 3–12 cm. long.

*S. AUREUS*, var. *AQUILONIUS*, forma **ecoronatus** (Fernald) comb. nov. *S. pseud aureus*, forma *ecoronatus* Fernald in RHODORA, xxx. 225 (1928).

*S. PAUPERCULUS* Michx., forma **inornatus**, f. nov., foliis basilaribus indivisis angusto oblanceolatis laminis 1.5–2.3 cm. longis 0.5–0.7 cm. latis; foliis caulinis valde reductis majoribus 1.5–3.5 cm. longis 2–5 mm. latis; phyllariis<sup>1</sup> lineari-attenuatis; floribus discoideis, ligulis nullis.—MICHIGAN: limestone pavement, Seul Choix School, Schoolcraft County, July 12, 1935, *Pease & Ogden*, no. 24,946 (TYPE in Herb. Gray.). ALASKA: Miller House, on Steese Highway, 115 miles north of Fairbanks, elevation 2100 feet, July 12–18, 1940, *Edith Scamman*; no. 2166.

Not to be confused with *Senecio pauperculus*, forma *verecundus* Fern. in RHODORA, xxx. 225 (1928), of Anticosti, a plant which has all the technical characters of *S. gaspensis* Greenm., to which it must be transferred.

*S. PAUPERCULUS* Michx., var. **neoscoticus**, var. nov. (TAB. 806), planta 1–4 dm. alta; foliis basilaribus indivisis 1.5–6.5 cm. longis 1–2 cm. latis; foliis caulinis imis plus minusve pinnatifidis 3.5–6.5 cm. longis 0.7–2 cm. latis; capitulis 2–25, longe pedicellatis; involucris 4–5 mm. altis basin versus persistenter tomentosis; achaeniis glabris 2 mm. longis.—NOVA SCOTIA: talus of gypsum cliffs, Five-mile River, Hants County, July 19, 1920, *Pease & Long*, no. 22,914 (TYPE in Herb. Gray.), distrib. as var. *Balsamitae* (Muhl.) Fern.; common on gypsum, Antigonish Harbour, July 11, 1941, *A. E. Roland*, no. 41,741, distrib. as var. *Balsa-*

<sup>1</sup> NOTE ON THE TERM PHYLLARY.—The term PHYLLARY, now largely used instead of involucre bract, is given by Jackson, Gloss. Bot. Terms, as coming from a Latin word "*phyllaris*", with the result that those of us who have depended upon Jackson have, naturally, made an ablative plural "*phyllaribus*". Bentham & Hooker and other English phytographers had used the term as later defined in the Century Dictionary and as originally adopted in this country by Blake, from the New Latin PHYLLARIUM. This is preferred to Jackson's nominative.



*mitae*; rock-faces and crevices of gypsum cliffs, Port Bevis, Victoria County, August 27, 1920, *Fernald & Long*, no. 22,915, also distrib. as var. *Balsamitae*. QUEBEC: gravelly bank near Percé, Gaspé County, July 14, 1928, *Pease*, no. 20,177.

Var. *neoscoticus* is the only variation of the plastic *Senecio pauperculus* (PLATE 804) known to me from Nova Scotia. It superficially resembles var. *Balsamitae* (PLATE 805) in having well developed lower cauline leaves, but it is unlike any of the other varieties of the species in having densely and permanently tomentose involucre, in the TYPE the tomentum at the base of the involucre or, in some plants, extending to the tips of the phyllaries. The conventional and not too convincing distinction between *S. plattensis* Nutt. (1841) and *S. pauperculus* Michx. (1803) is the occurrence somewhere on the former (on stem, petioles, pedicels or involucre or on two or more of the areas at the same time) of more or less persistent tomentum, while *S. pauperculus* is glabrate or merely with flocculent tufts of tomentum. Furthermore, to quote Greenman, the former species has "achenes usually hispidulous along the angles, sometimes glabrous". In *S. pauperculus* we get "achenes glabrous or hirtellous along the angles". That leaves mighty little which seems specific. Nevertheless, of many scores of mature collections of *S. plattensis* which I have studied essentially all have hispidulous achenes. Of more than 200 members of the inclusive *S. pauperculus* examined all but 3 numbers have shown glabrous achenes. I am not ready to reduce *S. plattensis*, without field-acquaintance with it. But in its densely tomentose involucre *S. pauperculus*, var. *neoscoticus* might be looked upon as a connecting link. In all other characters, however, it is good *S. pauperculus*.

A southeastern variety, *Senecio pauperculus*, var. *praelongus* (Greenm.) House, found from eastern Massachusetts to Michigan, south to Connecticut, Maryland and the upland of Virginia, is strikingly similar to and has often been mistaken for the ubiquitous southern *S. Smallii* Britton. In New England, New York and Michigan it passes into *S. pauperculus* var. *Balsamitae*, while in the elongate cauline and basal leaves and the numerous heads it looks like *S. Smallii*. The latter, however, usually has copiously hispidulous achenes only 1.5–2.2 mm. long, the former glabrous achenes 2–2.5 mm. long. There seems to be a recog-



nizable difference in the phyllaries. In *S. pauperculus* they are linear-attenuate, gradually tapering from the base; in *S. Smallii* they are more definitely linear-oblong, with parallel sides, and tapering only toward the summit. In typical *S. pauperculus* and its var. *Balsamitae* (Muhl.) Fern., furthermore, the more or less elongate rhizome is commonly prostrate, with decumbent branches. In *S. Smallii* the short rhizome has crowded erect crowns. The photograph of the TYPE of *S. Balsamitae* Muhl. ex Willd. sent me by Professor Diels is of the northern few-leaved plant. I am clinging to these characters for what they may be worth.

Far to the northeast there is a series of plants of this affinity, growing from western Newfoundland to Anticosti, thence to northern Maine, which differs from *Senecio pauperculus* in usually broader and heavier foliage, the basal leaves tending to be elliptic or oval but sometimes oblanceolate, the disk very broad. These are the two extremes which were described as *S. gaspensis* Greenm. in Ann. Mo. Bot. Gard. iii. 138 (1916) and as *S. Balsamitae* var. *firmifolius* Greenm. in RHODORA, vii. 244 (1905) or *S. pauperculus* var. *firmifolius* (Greenm.) Greenm. in Ann. Mo. Bot. Gard. iii. 166 (1916). In their extremes the two are very different, but some of the larger specimens cited by Greenman as var. *firmifolius* are inseparable from smaller ones determined or cited by him under *S. gaspensis*. Typical *S. gaspensis* differs still further from *S. pauperculus* in having the undivided basal leaves broader (1.5–4.5 cm. broad, the basal leaves of *S. pauperculus* ranging from 0.5–2 cm. broad). Furthermore, in both typical *S. gaspensis* and in *S. pauperculus* var. *firmifolius* the phyllaries are linear-oblong, with parallel (instead of gradually converging) sides, tapering only near the tip. This apparently fairly definite species also includes the discoid form of Anticosti which, before I had spent two weeks upon the group, I placed under *S. pauperculus*. As I understand the plants I should now treat them as follows.

*S. GASPENSIS* Greenman in Ann. Mo. Bot. Gard. iii. 188 (1916). Stem 2–6 dm. high; undivided basal leaves with the larger blades 3.5–8 cm. long and 1.5–4.5 cm. broad; flowering stem very leafy; larger cauline leaves 5–12 cm. long, 1–3 cm. broad, chiefly pinatifid only below the middle; pedicels mostly 2–10 cm. long; glabrous achenes 2.5–3 mm. long.—Bottomlands, damp shores,





Photo. B. G. Schubert.

SENECIO PAUPERculus, var. BALSAMITAE: FIG. 1, type of *S. BALSAMATAE* Muhl.,  $\times 1$ , kindness of Professor *Ludwig Diels*; FIGS. 2, 3 and 4, portions of a modern specimen from type-region,  $\times 1$ ; FIG. 5, involucre,  $\times 5$ , from latter specimen